February 2014

Prepared by:

The CSWP Local Planning Team In Lyon County

Carson Watershed Subconservancy District

City of Fernley Community & Economic Development Department

City of Fernley Public Works & General Services Department

City of Yerington

Douglas County GIS Division

Lyon County Public Works Department

Lyon County Planning Department

Nevada Division of Environmental Protection

North Lyon County Fire Protection District

Resource Concepts, Inc.

Silver Springs Mutual Water Company

Stagecoach General Improvement District

Community Source Water Protection Plan

For Public Water Systems in Lyon County, Nevada

Prepared by:

The Community Source Water Protection Local Planning Team in Lyon County

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Acknowledgements

The Lyon County Community Source Water Protection Team wishes to acknowledge the technical assistance provided by Resource Concepts, Inc., the US Geological Survey, the Carson Watershed Subconservancy District, facility meeting accommodations provided by Lyon County Utilities and funding and technical assistance from the Nevada Division of Environmental Protection. The team would like to recognize the following organizations that made development of this document possible. Contact one of the utilities listed below for information about the Community Source Water Protection Plan in your area, or contact the Nevada Division of Environmental Protection for general information about Nevada's Integrated Source Water Protection Program.

Organizations	Phone Number	Email Address
Utilities		
City of Fernley Public Works & General Services Department	775-784-9910	dpeters@cityoffernley.org
City of Yerington	775-463-2284	manager@yerington.net
Lyon County Public Works Department	775-246-6220	lyonutilities@lyon-county.org
Silver Springs Mutual Water Company	775-577-2223	ssmwc@sbcglobal.net
Stagecoach General Improvement District	775-629-0849	sgid@pyramid.net
Planning		
City of Fernley Community & Economic Development Department	775-784-9900	mhauenstein@CityofFernley.org
Lyon County Planning Department	775-463-6592	planning@lyon-county.org
State of Nevada		
Nevada Division of Environmental Protection	775-687-9503	kborgzinner@ndep.nv.gov
Technical Resources		
Carson Watershed Subconservancy District	775-887-7450	edjames@CWSD.org
Douglas County GIS Division	775-782-9045	eschmidt@co.douglas.nv.us
Farr West Engineering	775-851-4788	greg@farrwestengineering.com
North Lyon County Fire Protection District	775-575-3310	shuntley@northlyonfire.com
Resource Concepts, Inc. and Subconsultants	775-883-1600	jill@rci-nv.com lynn@rci-nv.com
Stanka Engineering	775-885-9283	david@stankaconsulting.com

List of Acronyms

BHPS	Bureau of Health Protection Services (State/presently Bureau of Safe Drinking Water)
BLM	USDI Bureau of Land Management
BOR	USDI Bureau of Reclamation
BSDW	Bureau of Safe Drinking Water (State/DEP)
BWPC	Bureau of Water Pollution Control (State/DEP)
CSWP	Community Source Water Protection
CWSD	Carson Water Subconservancy District
DCNR	Department of Conservation and Natural Resources (State)
DEP	Division of Environmental Protection (State)
DHHS	Department of Health and Human Services (State)
EPA	U.S. Environmental Protection Agency (Federal)
GIS	Geographic Information System
GPM	Gallons per Minute
GPS	Global Positioning System
ISWPP	Integrated Source Water Protection Program
LCU	Lyon County Utilities
MCL	Maximum Contaminant Level
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection (State)
NRS	Nevada Revised Statutes
NvRWA	Nevada Rural Water Association
PCS	Potential Contaminant Source
PWS	Public Water System
SSMWC	Silver Springs Mutual Water Company
SWPA	Source Water Protection Area
USDI	United States Department of the Interior
USGS	United States Geological Survey
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program

Executive Summary

The purpose of this Community Source Water Protection Plan for Lyon County Public Water Systems (CSWP Plan) is to document the public drinking water resources in Lyon County and the measures that the communities intend to implement to protect those resources. The CSWP Plan is a tool to facilitate cooperation and education between water purveyors, local and State agencies, industry, community leaders, and citizens to aid in the management and continued safety of the Lyon County communities' drinking water resources.

In June 2010, the Lyon County Commissioners, Cities of Yerington and Fernley Councils, and the various water system district boards throughout Lyon County were provided with an overview of the State of Nevada's Integrated Source Water Protection Program (ISWP Program). The ISWP Program is voluntary, and is focused on preventing the pollution of community drinking water sources, including ground water, lakes, rivers, springs, and streams. Each community provided letters requesting participation in the program and committed staff to provide support for developing the plan.

This CSWP Plan includes the public water systems throughout Lyon County including the City of Fernley, City of Yerington and Weed Heights in Mason Valley, Dayton Valley, Stagecoach, Silver Springs, and Smith Valley. This CSWP Plan provides a framework for the long-term protection of public drinking water supply sources. Maps of the specific areas are provided in Appendix A.

The Local Planning Team (Team) responsible for creating this document was composed of representatives from the various public water systems in Lyon County and from local and state government. The Team met frequently over the course of a year and a half to develop this plan. Summaries of the meetings, the agendas and meeting materials are provided in Appendix B. The Team identified five goals to protect drinking water, guide the development of this CSWP Plan as well as implementation of this plan.

Goal 1: The plan needs to be understandable, endorsable, useable, accessible and easy to update
Goal 2: Protect existing and future public groundwater and surface water quality and supplies
Goal 3: Provide tools for community and development planning (data, maps, future development plans
Goal 4: Encourage collaboration and communication between entities in and surrounding Lyon County
Goal 5: Educate students and the general public regarding source water protection

Groundwater is the sole source of drinking water supply for all public water systems in Lyon County. Community public water systems in Lyon County are located in the City of Fernley (6 existing wells), Dayton (10 existing wells), Stagecoach (2 existing wells), Silver Springs (3 existing wells), City of Yerington (5 existing wells) and Weed Heights (2 existing wells). There are also 22 Non-Community water systems scattered across the county that serve stores, restaurants, parks, camping resorts, schools, and industrial facilities.

Source Water Protection Areas (SWPAs) are composed of the land surrounding a water supply source where activities are managed to protect the water supply from becoming contaminated. These management area boundaries were developed based on the land uses, parcel boundaries and well "capture zones" described in the Capture Zone Delineation Summary Report provided in Appendix C. Maps of the SWPAs are provided in Appendix A.

Potential sources of contaminants in the vicinity of public supply wells were identified through an inventory of the existing wellhead protection plans, initial meetings with water system operators, evaluation of the local hydrogeology, review of existing on-line databases, and review of the ISWP Program guidance. There are some potential contaminant sources (PCSs) that occur in each community in Lyon County. Specifically, high nitrates from septic systems and hazardous or poisonous materials from commercial, industrial and manufacturing areas, homes and agriculture are the primary concerns. Summary tables of the inventory are included in Appendix D. The tables summarize the key characteristics of the 60 public wells as well as the 31 SWPAs.

Source water protection strategies and actions were developed in order to avoid contaminants from being released in the SWPAs, which in turn could avoid costly and/or irreversible damage to the water sources. The source water protection strategies detailed in Section 3.4 include developing public education programs, household hazardous waste programs, development standards, inter-agency coordination, monitoring and some new infrastructure projects. The Team developed an Action Plan, provided in Appendix E, that lists specific actions to be implemented as funding, staff and time allow. Details regarding public education and outreach are provided in Appendix F.

A Contingency Plan is provided in Section 3.5. The existing contingency plans for the public water systems are referenced and a contingency plan for Lyon County as a whole is provided. The purpose of the contingency plan is to provide guidance and direction in the event that the aquifers or main sources of drinking water are significantly contaminated.

A discussion regarding new well siting for future public wells is provided in Section 3.6 and depicted on the appropriate maps. The management strategies to protect these future locations have been incorporated into the CSWP Plan.

The CSWP Plan should be revisited on a regular basis to ensure its continued success. The communities may identify new sources of contamination or experience an event that changes the characteristics of the community's water supply. Regular updates will ensure that the CSWP Plan incorporates significant or future changes within the communities.

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1.0 INTRODUCTION

1.1 Overview

Community Source Water Protection involves voluntary actions to prevent the pollution of community drinking water sources, including groundwater, lakes, rivers, springs and streams. It includes developing and implementing a Community Source Water Protection Plan (CSWP Plan, Plan) to manage land uses and "man-made" sources of contamination in the vicinity of public water supplies. Local plans are long-term commitments by the communities to protect their drinking water (NDEP, 2010).

Source Water Protection Areas (SWPAs) are comprised of the land surrounding a water supply source where activities should be managed to protect the water quality. The SWPAs allow communities to plan for and respond to situations before contamination occurs.

1.2 Background

Public water systems (PWSs) throughout Lyon County, Nevada, have voluntarily participated in the development of this comprehensive and coordinated CSWP Plan in order to protect their drinking water resources and thereby ensure a high quality, sustainable water supply for their communities. This CSWP Plan includes 25 PWSs that manage 60 wells throughout Lyon County in the City of Fernley, Dayton Valley, Stagecoach, Silver Springs, Smith Valley, and Mason Valley including the City of Yerington and Weed Heights (Figure 1). For purposes of this Plan, the term "Community" collectively refers to the PWSs, residents and local governments located within these areas of Lyon County.

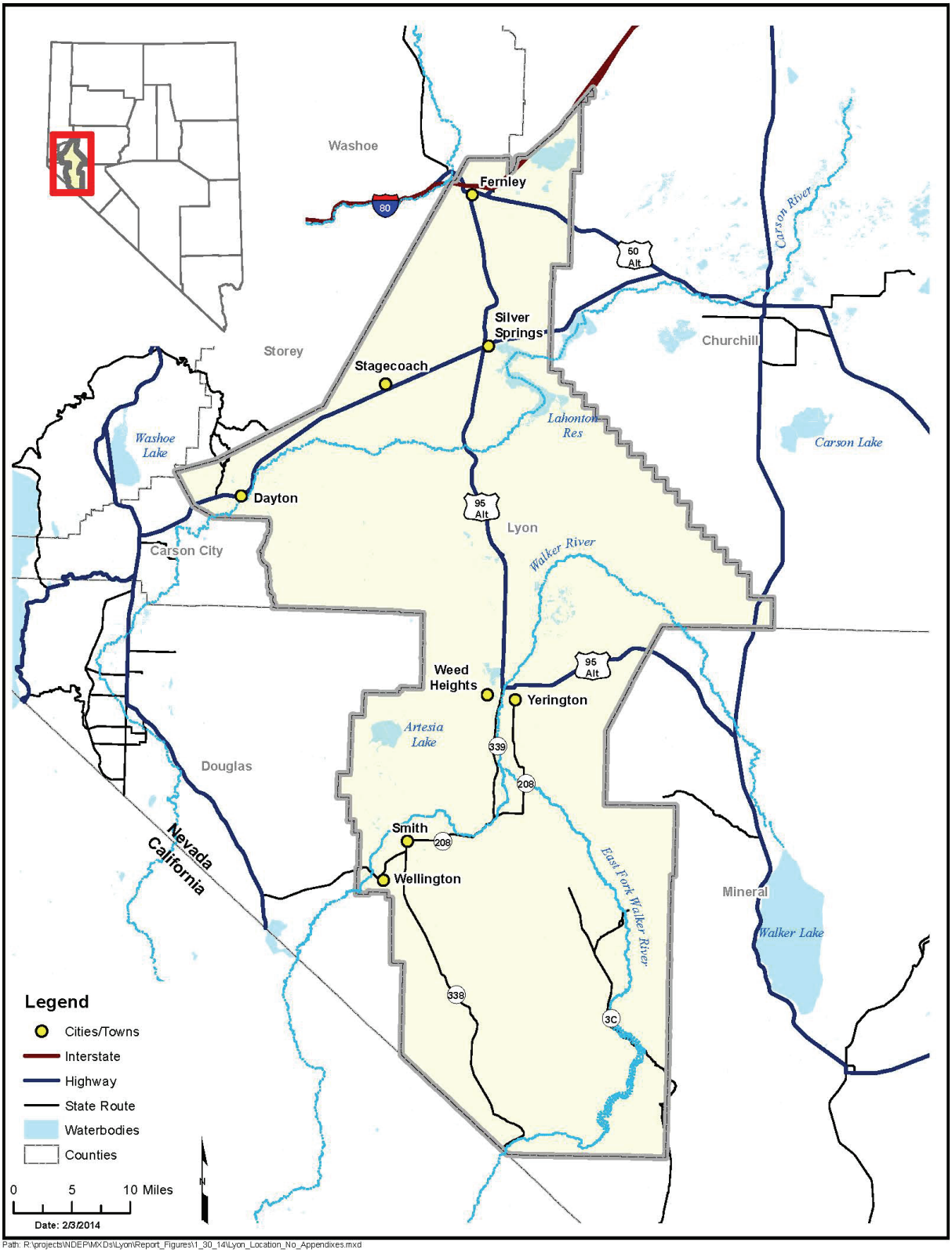
There are six community and 19 non-community water systems in Lyon County as defined by Nevada Revised Statutes (NRS) 445A.235. Five of the six community water systems have existing wellhead protection (WHP) plans that were used in the development of this CSWP Plan. This CSWP Plan is a broader, community-wide perspective, building upon the pertinent information and results from the previous plans completed by the individual PWSs and communities.

Development of this Plan is based on the guidance document entitled Nevada Integrated Source Water Protection Program (ISWPP), which was prepared by the Nevada Division of Environmental Protection (NDEP) in February 2010 as an update to the 1994 State Wellhead Protection Program. The guidance document sets the framework for local plan development and outlines the criteria required for a CSWP plan to receive State endorsement. With a State-endorsed plan, a local Community may be eligible to receive additional technical assistance from NDEP to continue implementing the management strategies outlined in the CSWP Plan. This CSWP Plan has been developed with the intention of achieving State endorsement.

1.3 Plan Purpose

The purpose of this Community Source Water Protection Plan (CSWP Plan) is to document the public drinking water resources in Lyon County and the measures that the communities intend to implement to protect those resources from contamination. The CSWP Plan is a tool to facilitate cooperation between water purveyors, local and State agencies, industry, community leaders, and citizens to aid in the management and continued safety of the Lyon County communities' drinking water resources.

Figure 1 Location Map



1.4 Description of Planning Area and Source Water

1.4.1 Location and Setting

Lyon County is located in west central Nevada. It totals 2,016 square miles and is the second smallest of the state's 17 counties. Lyon County is bordered on the north by Storey and Churchill Counties, to the west by Douglas County and the County of Carson City, on the south by Mineral County and the State of California, and to the east by Churchill and Mineral Counties (Figure 1).

Lyon County includes two incorporated cities, Fernley and Yerington. Communities include Dayton, Mason Valley, Mound House, Silver Springs, Stagecoach, Weed Heights, Smith Valley and Wellington. According to the U.S. Census Bureau Lyon County had a population of 51,980 people in 2010.

1.4.2 Current, Future, and Inactive Wells

All public source water in Lyon County is from groundwater wells managed by public water systems. There are three types of public water systems in Lyon County: Community, Non-Community, and Non-Transient Non-Community. In Lyon County, there are currently 29 Community, 15 Non-Community, and seven Non-Transient Non-Community public water system wells. There are nine planned Community wells. These types of systems are described in the following paragraphs. The 60 current and proposed future public wells included in this plan are summarized by the water system type in the following sections.

Community Water System Wells

A Community Water System is a public water system that has at least 15 service connections used by year-round residents of the area served by the system or regularly serves at least 25 year-round residents of the area served by the system (NRS 445A.808). Examples include municipal water systems operated by a county or town or mobile home parks. The Community Water Systems and their wells are summarized in Table 1-1.

Table 1-1. Community Water System Wells Considered in this Plan

Water System Name and Primary Contact	Well Name		
Community Water Systems[1/]	**Active**	**Wells**	**Future Wells**
NV0000032 Dayton Valley Water System (Lyon County Public Works) Operations Manager	Well 2 Well 3 Well 4 Well 5 Well 6	Well 7 Well 8 Well 9 Well 10 Well 20	Well 1 (Future) Rolling A Well (Future) ASR Well (Future)
NV0000062 City of Fernley Public Works City Engineer	Well 4 Well 9a Well 9	Well 11 Well 13 Well 14	Well 8 (Future) Well 12 (Future) Armstrong Well (Future)
NV0000223 Silver Springs Mutual Water Co. Manager	Lake St Well 5 Idaho St Well 4	Deodar Well	
NV0000224 Stagecoach GID Manager	Central Well Well 1	Churchill Downs Well 5	
NV0000242 Weed Heights Development Owner	Well 1 TAC	Well 2 BLM	
NV0000255 City of Yerington City Manager	Well 3 Broadway Rio Vista Well	Mason Road Well Mountain View Well 6 California Well	Mason Road (Future) Rio Vista Well (Future) Well 1 (Future)

[1/] The water system numbers are from the Bureau of Safe Drinking Water (NDWIS, December 2012).

Non-Community Water System Wells

A Non-Community Water System is a public water system that is not a community water system (NRS 445A.828). Examples include restaurants and service stations.

A Non-Transient Non-Community Water System is a non-community water system that regularly serves at least 25 of the same persons for more than 6 months per year (NRS 445A.829). Examples include schools and factories.

There are nineteen non-community water systems in Lyon County. These public water systems serve stores, restaurants, parks, camping resorts, schools, and industrial facilities throughout Lyon County. Table 1-2 summarizes the non-community water systems considered in this CSWP Plan.

Table 1-2. Non-Community Water System Wells Considered in this Plan

Non-Community Water System Water System Name and Current Primary Contact [1/]	Well Name
NV00002593 Dressler Park Lyon County Public Works	Well 1
NV0000389 Buckboard General Store Brian Cristof	Well 1
NV0002128 CG Bar Jeff Litterer	Well 1
NV0005020 Churchill Butte Complex Jim Morehouse	Well 1
NV0003098 East 50 Bar Bob Wall	Well 1
NV0000881 Gold Canyon Steakhouse Mike Padgett	Well 1
NV0004037 Heyday Inn Bill Bohlin	Well 1
NV0002132 Nevada State Park, Ft. Churchill Historic Scott Payne	Well 1
NV0002133 Nevada State Park, Lahontan Dam Beach 3 Scott Payne	Well 1
NV0005021 Nevada State Park, Lahontan Dam Beach 7 Scott Payne	Well 1
NV0000951 Rosies Place Juan Verdugo	Well 1
NV0000858 Sherrys Steakhouse Coy Williams	Well 1
NV0002608 Stagecoach Country Market Obaid Mobaligh	Well 1
NV0004048 Walker River Resort Kathy Johnson	Well 1
NV0000243 Wellington Station Resort Michelle Van Sickle	Well 1

Non-Transient Non-Community Water System Name and Current Primary Contact	Well Name
NV0000806 Fort Churchill Power Plant Kim Williams	Well 1 Well 2
NV0004053 Hodges Transportation Co Albert Holly	Well 1 North Well 2 South Well 3 House
NV0002189 Smith Valley Schools David Vick	Well 1
NV0002515 Snyder Livestock Company Inc Roy McDonald	Well 1

[1/] The water system numbers and contact information are from the Bureau of Safe Drinking Water (NDWIS, December 2012).

Inactive Wells

There are eighteen inactive wells in the plan area. These inactive wells are abandoned or are scheduled to be abandoned by the public water system and are not intended to be potable water sources in the foreseeable future. Table 1-3 lists the inactive public wells.

Table 1-3. Inactive Wells Considered in this Plan

Water System Name and Primary Contact	Inactive Well Name	
NV0000032 Dayton Valley Water System (Lyon County Public Works) Operations Manager	Well 1 Well 11 Well 12 Well 13 Well 14	Well 15 Well 16 Well 17 Well 18 Well 19
NV0000224 Stagecoach GID Manager	Well 2, 3, 4 (Abandoned)	
NV0000223 Silver Springs Mutual Water Co. Manager	Well 1 Ft. Churchill	
NV0000255 City of Yerington City Manager	Well 1 Mountain View Well California St	
NV0000858 formerly Sherry's Steakhouse	Well 2	
NV0000376 formerly Hoye Plaza	Well 1	

1.4.3 Municipal Water System Descriptions

There are six municipal public water systems providers in Lyon County. These systems provide water to the majority of the Lyon County population.

City of Fernley

The City of Fernley is located in the northern part of Lyon County near the Storey and Washoe county borders (Figure 1). The Truckee River Canal is a significant source of groundwater recharge in the area. All of the drinking water supplied by the City of Fernley comes from six groundwater wells.

The City of Fernley provided 1,316 billion gallons of drinking water in 2012. Fernley has a groundwater arsenic removal treatment facility constructed in 2010. The facility processes include: coagulation, flocculation, sedimentation, microfiltration and chlorine disinfection through sodium hypochlorite solution (no fluoride or softening processes). Arsenic is a naturally occurring constituent in local groundwater.

Lyon County Utilities (LCU):

Dayton and Mound House are located in the northwestern portion of the County in the Carson Plains subbasin of Carson River basin (Figure 1). LCU provides water service to Mound House and Dayton areas. LCU also operates the Dressler Park water system in Smith Valley. LCU has one surface right infiltration well used conjunctively for certain periods of the year. All of the water supplied to these systems comes from 10 existing groundwater wells.

There are nine inactive wells in the Mound House area that LCU intends to abandon. The Dayton and Mound House water systems are now linked by a 16-inch pipeline. Water is boosted to Mound House to provide approximately 90-100 percent of its supply. A 16-inch pipeline was completed in 2008 that inter-ties Carson City and Lyon County Utilities water systems. The water supply sources vary with seasonal storage and demand.

Stagecoach GID

Stagecoach is located in the north central portion of the County. It is in the Stagecoach subbasin of the Carson River basin (Figure 1). The Stagecoach GID provides water to approximately 550 customers. All of the water supplied to the customers comes from two groundwater wells. Use of three previous wells has been discontinued due to high salinity, nitrate or arsenic levels or low water production. Arsenic is naturally occurring in the local groundwater.

Silver Springs Mutual Water Company,

Silver Springs is located in the north central portion of the County. It is in the Churchill Valley subbasin of the Carson River basin (Figure 1). The Silver Springs Mutual Water Company (Silver Springs MWC) provides water to approximately 1,099 connections.

Silver Springs MWC has an arsenic treatment plant completed in 2010. Arsenic is naturally occurring in the local groundwater.

According to the 2000 census, the average household size is 2.59 people yielding a base population served by Silver Springs MWC of 2,846 people (Farr West Engineering, 2007). All of the water supplied to these systems comes from three wells.

Weed Heights Development

Weed Heights is located in the Mason Valley subbasin of the Walker River basin (Figure 1). There are approximately 150 homes served by the water system and a restaurant, recreation hall, park and a golf course. Weed Heights operates two wells and one arsenic treatment plant. Arsenic is naturally occurring in the local groundwater.

City of Yerington

The City of Yerington is located in the central portion of the County. It is in the Mason Valley subbasin of the Walker River basin (Figure 1). The City of Yerington utilities serves approximately 2,900 persons.

The City operates one arsenic treatment plant and five wells. The Mountain View and Broadway wells to not have storage tanks and are "time of use" wells. The California Well has excellent water quality that does not require arsenic removal. Due to supply and water quality limitations, the Mason Well is typically not used and the Rio Vista Well is used in emergencies only.

1.5 Existing Plans and Studies

There are many existing investigations that are relevant to and or used in the development of this CSWP Plan. Documents that were critical to the process are listed in the following sections and tables.

1.5.1 Existing Wellhead Protection Plans

The existing wellhead protection plans (WHP Plans) were the starting points for all of the communities. There were five WHP Plans in Lyon County that were reviewed with the Local Planning Team. Pertinent information in these plans were extracted, updated and used in this CSWP Plan (Table 1-4).

Table 1-4. Existing Well Head Protection Plans Used in this CSWP Plan

Entity	WHPP Year	Prepared by
City of Fernley [1/]	1994 2008 Update	Wateresource Consulting Engineers, Inc. (WCE)
Lyon County	2004 2008 Update	Farr West
Silver Springs	2003	Farr West
Stagecoach	2002	SGID and NV Rural Water Assoc.
City of Yerington	2001	Thiel Engineering and NV Rural Water Assoc.

[1/] Note: The Fernley WHPP has not been endorsed by the State of Nevada.

1.5.2 The Vulnerability Assessment and Source Water Assessment Programs

The Vulnerability Assessment Program and Source Water Assessment Program are both programs administered by the State of Nevada Bureau of Safe Drinking Water (BSDW). These two programs are summarized below and additional information is available at http://ndep.nv.gov/bsdw/.

The Vulnerability Assessment Program investigates and assesses the vulnerability to contamination of public water system sources. Pertinent information from the completed Vulnerability Assessments has been used for the development of this report. Information includes well ownership, location, name, diameter, depth, and pumping rates. Specific information regarding all of the data used is detailed in the Well Capture Zone Delineation Report provided in Appendix C.

The Source Water Assessment Program is required by the federal Safe Drinking Water Act (SDWA) Amendments of 1996 to analyze existing and potential threats to the quality of the public drinking water throughout the state. This program contains all of the following components: 1) the areas that are sources of public drinking water are delineated, 2) potential contaminant sources within the delineated area are identified, 3) the water systems' susceptibility to contamination is assessed, and 4) the public is informed of the results. Where applicable, the well information gathered through this program has been used to update well evaluations (Appendix C). The well risk rating has also been used in assessing potential contaminant sources in the CSWP Plan development.

1.5.3 Other Studies

There are a number of studies regarding groundwater hydrology that were used in the development of the capture zone models. All studies are referenced at the end of this document. The following studies were the primary information sources to characterize groundwater movement and aquifer parameters.

- US Geological Survey (USGS) Reports: The regional reports for the Carson River and Walker River basins prepared by the USGS were key in the selection of groundwater parameters such as transmissivity values.
- Desert Research Institute (DRI) Report: The DRI prepared a Truckee Canal Seepage Analysis in the Fernley area which was important in the well capture zone modeling for that area.
- The Nevada Division of Water Resources Bulletins provided useful geohydrology information for the modeling effort.

2.0 TEAM FORMATION & PROGRAM GOALS

2.1 Team Formation Summary

2.1.1 Initial Stakeholder and Well Owner Outreach

In June 2010, the ISWPP staff presented the plan development process and assistance opportunity to the Lyon County Commissioners, the City Councils for Yerington and Fernley, and the district boards for Silver Springs and Stagecoach. As a result, each board provided a letter to the NDEP requesting participation in the program and committed staff to provide support for the liaison in each community who would provide technical support in developing the CSWP Plan.

In August 2012, the NDEP sent letters of introduction to all involved well owners listed in Table 1-1 regarding the role of RCI in the ISWPP in Lyon County. RCI called well owners in the fall of 2012 to introduce them to the project, request pertinent well information, and solicit participation in the Local Planning Team.

2.1.2 Meetings and Workshops

RCI met individually with each community to introduce them to the program, garner information, and get preliminary input for management strategies. Meeting agendas and summaries are provided in Appendix B. Invitations to all public water well owners were provided either via e-mail, regular mail or phone call prior to each meeting. Agendas and meeting materials were typically provided at least one week in advance of the meetings.

Lyon County, the City of Yerington, and the City of Fernley were represented at most meetings. Silver Springs, Stagecoach and the small water providers that were not able to attend meetings were kept appraised of the plan development process via e-mailings, phone calls, and mail.

RCI developed a web page (www.rci-nv.com/source_water_protection) containing all pertinent project information including team members, meeting minutes, working documents, and maps. In addition, all digital mapping information was made available through an on-line interactive GIS mapping tool referred to as the Lyon County Flex Viewer

Digital outreach was very effective for those Local Planning Team members that use the Internet and have e-mail. A handful of the small water providers did not use the Internet or have e-mail so information was provided to them via mail and phone calls.

2.2 Local Planning Team Members and Roles

Early in the planning process, four steering committee teams were developed to prepare this CSWP Plan: Technical Team, Education Team, Planning Team, and Document Review Team. All team members were invited to all of the meetings and kept appraised of the plan progress. The members and their roles are outlined in Table 2-1.

Table 2-1. Local Planning Team Members and Roles

Name	Jurisdiction/Title	Roles
Dan Newell	City of Yerington County Manager	City of Yerington engineering, water system operations, and planning
Ed James	CWSD General Manager	Carson River quality quantity, water transfers, watershed management
Jim Woodward	Stagecoach GID Technician	Stagecoach GID operations and planning
Jim Youngblood	Lyon County Operations Manager	Lyon County Public Works water system operations and administration
Mike Workman	Lyon County Public Works Director	Lyon County Public Works operations and administration
Misty Mann	Lyon County Development Services Manager	Lyon County Public Works water system recordkeeping and administration
Mojra Havenstein	City of Fernley NCARB, LEED Neighborhood Development Director	City of Fernley planning
Nancy Sbragia	Private Landowner	Public outreach
Rob Loveberg	Lyon County Planning Director	Lyon County Planning and Emergency Management
Scott Keller	Silver Springs Mutual Water Co.	Silver Springs MWC planning
Sean Sinclair	Lyon County Engineering Technician	Public outreach and education
Denton Peters Shari Whalen	City of Fernley City Engineer	City of Fernley engineering, planning, water system operations
Steve Henderson	City of Fernley Water Distribution Foreman	City of Fernley water system operations
Lynn Zonge Jill Sutherland	Resource Concepts, Inc.	Technical writing and meeting coordination Public outreach and education

2.3 Source Water Protection Goals

The Team identified five plan goals to protect drinking water. These goals were developed during a series of meetings and build on the goals in the existing WHP Plans. The following plan goals were used to guide the development of this CSWP Plan as well as implementation of this plan. The objectives to achieve these goals are the management strategies and action plan discussed in Section 3.4.

Table 2-2. Goals Established by the Local Planning Team for Lyon County Communities.

Goal 1: The plan needs to be understandable, endorsable, useable, accessible and easy to update
Goal 2: Protect existing and future public groundwater and surface water quality and supplies
Goal 3: Provide tools for community and development planning (data, maps, future development plans
Goal 4: Encourage collaboration and communication between entities in and surrounding Lyon County
Goal 5: Educate students and the general public regarding source water protection

3.0 PLAN DEVELOPMENT

3.1 Source Inventory and Planning

3.1.1 Plan Area Setting

Groundwater is the sole source of drinking water supply for all public water systems in Lyon County. Public water systems in Lyon County are located in three different river basins: the Truckee River via the Truckee Canal in the Fernley area, the Carson River in the Dayton and Silver Springs areas and the Walker River in the Yerington and Smith Valley areas of the county. The productive community wells considered in this plan are located in aquifers recharged by these rivers during spring runoff. Smaller wells are located on alluvial fans. Geologic and hydrologic details for each well are provided in the Capture Zone Delineation Report provided as Appendix C.

3.1.2 Historical, Current and Projected Future Groundwater Conditions

Fernley

Groundwater conditions near public supply wells in Fernley currently appear relatively stable. Seepage losses from the Truckee Canal are the major source of recharge to the groundwater basin. The City of Fernley treats water to remove naturally occurring arsenic. The groundwater is also naturally high in calcium and silica.

Dayton Area and Carson Plains

Currently water levels in the subbasin are stable due to recharge from the Carson River and decreases in pumping for both municipal and agricultural uses. Water levels had declined about 10 ft from 1995 to 2009 in the industrial area south of Dayton near Wells 2, 3 and 4. However, new supply wells on the eastern side of the valley, Wells 8 and 20, have reduced the demand for pumping from Wells 2, 3, and 4. The groundwater quality in the Carson Plains subbasin is generally good and LCU's active wells meet drinking water standards without treatment. However, nitrate occurs in the shallow aquifers where developments are served extensively by septic systems.

Stagecoach

In the Stagecoach subbasin, water levels are currently stable. Stable groundwater conditions in the future for the Stagecoach subbasin are uncertain because of its distance from the Carson River and the relatively small amounts of recharge from the surrounding mountains. Increases in either municipal or agricultural use may cause additional water-level declines. Arsenic and nitrate concentrations in groundwater are generally high and are a concern in the future for meeting drinking water standards.

Silver Springs Area and Churchill Valley

Groundwater conditions near public supply wells for Silver Springs in Churchill Valley are generally stable, although they vary depending on the amount of water stored in Lahontan Reservoir. In wet years when the reservoir is high, groundwater is recharged. In dry years groundwater levels decline. The groundwater in the Silver Springs area has high arsenic levels as well as total dissolved solids (TDS), sulfate, iron, and manganese.

Mason Valley and Smith Valley

The Walker River is the major source of groundwater recharge for the Mason and Smith valleys. Currently water levels are relatively stable. However, water levels have dropped as much as 60 feet since the 1960s due to pumping for agriculture. Arsenic concentration varies by well location and depth in the Mason Valley area. The City of Yerington installed an arsenic removal plant in November 2011.

3.1.3 Current measures for protecting groundwater from contaminant sources

Public well purveyors in Lyon County have implemented a number of measures to protect groundwater from contaminant sources. The existing wellhead protection plans have been utilized to protect groundwater resources. The various actions of each entity to protect groundwater are summarized in the following tables.

Table 3.1. Actions Implemented by the City of Fernley to Protect Source Water

Physical Actions	> Conducted well survey and abandoned selected wells. > Developed a groundwater monitoring program, installed various monitoring wells and monitors regularly for water level elevations and water quality. > Holds an annual household cleanup day when people can drop off household chemicals at the Town Hall.
Education and Outreach	> Holds the National Public Works Week day for the elementary school. > Placed educational notices in the local paper, developed educational posters and flyers. > Produced a 10-minute video called “It’s Up to Us!”. The video explains the entire concept of wellhead protection and was shown for several months on a local television channel.
Coordination, Ordinances and Other Plans	> New industries must fill out a discharge notice to determine if pre-treatment is needed. > The City of Fernley regularly updates several plans that help to protect source water: • A City Master Plan • A Sewer Master Plan • A Water Master Plan • A Storm Drain Master Plan (in process)

Table 3.2. Actions Implemented by Lyon County to Protect Source Water

Physical Actions	> Visually inspects wellhead protection areas for surface spills at least every six months. > Improved the security of each well site in accordance with the LCU Water System Security Vulnerability Assessment. > Conducted well survey in 2006 and abandoned selected 15 to 20 wells. > Conducted on-going groundwater monitoring for wells near gas stations. > Conducted on-going groundwater monitoring for nitrate levels. > Coordinated with the NHP and NDOT for wells near highway corridors. > Performed analysis of septic systems and completed GIS mapping of septic systems in 2008. > Conducts semi-annual Hwy 50 clean up days. > Facilitated and Eagle Scout project to mark every surface storm drain. > Conducts site-specific trash pick up.
Education and Outreach	> Works with local newspapers to inform the public concerning source water protection and environmental stewardship. > Holds annual Wellhead Awareness workshops in the 5th grade classes at Sutro Elementary. > Provided educational materials to business owners.
Coordination, Ordinances and Other Plans	> Holds roundtable discussions between applicants and County departments prior to building permit issuance. > Implemented operating standards for application of pesticides and storage of hazardous substances. > Implemented a domestic well credit program approved by DWR in 2006 that includes requirements for DWR approved abandonments. > Adopted a Wellhead Zoning Ordinance. > Adopted Subdivision ordinances. > Adopted Wellhead Protection and Industrial Pretreatment Ordinances in 2007. > Lyon County Utilities regularly updates several plans that help to protect source water. > Water and Waste Water Master Plans. > Lyon County has several ordinances and policies that help to protect source water: • Lyon County Water Ordinance - Title 9 - Chapter 3 - addresses backflow and cross connection requirements. • Lyon County Water Ordinance - Title 9 - Chapter 6 - addresses Industrial Wastewater Discharge requirements. • Lyon County Comprehensive Master Plan Policy NR 3.1 Water Supply and Quality addresses sewer systems, septic systems, stormwater controls, low-impact development.

Table 3.3. Actions Implemented by Stagecoach GID to Protect Source Water

Physical Actions	> Investigated areas for new well locations. > Started coordination with the Carson Water Subconservancy District for improving water supply and quality.
Education and Outreach	> Put up posters in the GID offices for the public outreach. > Participated in the WHP program and coordinated with Nevada Rural Water Association. > Provided information on nitrate removal systems.
Coordination, Ordinances and Other Plans	> Developed a waste water ordinance to require new developments to run dry sewer lines to the street. > Adopted a Nitrate Removal for Wastewater Ordinance to mandate denitrification septic systems for areas outside of sewer service area.

Table 3.4. Actions Implemented by Silver Springs MWC to Protect Source Water

Physical Actions	> Conducted an arsenic treatment assessment and constructed an arsenic treatment plant. > Took the Ft. Churchill Well (5) off line. > Installed a new water tank, water lines, and generators. > Inspected the SWPAs for surface spills at least every six months.
Coordination, Ordinances and Other Plans	> The Manager of the SSMWC has the responsibility of approving parcels for water and sewer service. This authority gives SSMWC an opportunity to ensure that proposed development is in harmony with the SWPA. > Follow the guidelines in the Lyon County Emergency Response Plan and Hazardous Materials Response Plan. > Sent letters to NDOT and the Railroad regarding their SWPAs.

Table 3.5. Actions Implemented by the City of Yerington to Protect Source Water

Physical Actions	> Drilled a new California Well. > Removed the River Well from the municipal well system. > Installed an arsenic removal system.
Education and Outreach	> Coordinated with the Conservation District for public education in the schools.

3.2 Source Water Protection Areas and Delineation

3.2.1 Source Water Protection Area Development Considerations

In Lyon County, Source Water Protection Areas (SWPAs) are the areas of land surrounding a well where activities should be managed to protect the public water supply. The extent of the SWPAs for public wells in Lyon County was determined through a step-wise process that involved GIS mapping, team discussions, and management considerations.

The first step in defining the SWPAs involved mapping the extent of the well capture zones. The well capture zones were developed using a hydrologic model, which predicts groundwater extent and travel times influenced by groundwater pumping. The capture zones were developed for a 2-, 5-, and 10-year time of travel for each well using an EPA model and approved methods. These capture zones were presented and vetted at numerous Local Team meetings. In-depth descriptions of the data used and the modeling process are provided in the Capture Zone Delineation Summary Report provided in Appendix C.

Capture zones were overlaid with a variety of GIS databases including zoning, land use, topography, and parcel boundaries. The Local Planning Team wanted the SWPAs to coincide with parcel boundaries so that the areas could be identified with a mechanism already in their land use systems.

The capture zones were also overlaid with potential contaminant sources, or PCSs, described in detail in Section 3.3 of this document. The Local Planning Team members have good knowledge regarding where the active industrial and commercial areas are located and wanted to be sure that these areas were considered in developing the SWPA boundaries.

The next step of drawing the SWPA boundaries began as a GIS exercise where all parcels touching the 10-year capture zone were highlighted. Where these parcels were greater than 10 acres, then a 200-foot buffer outside of the 10-year capture zone was used instead of the parcel boundary.

Many of the municipal wells have close or overlapping capture zones. In these areas, the SWPAs were merged rather than having adjacent or touching SWPAs. The SWPA boundaries in these areas were drawn by the Local Planning Team to include areas with high-density residential or commercial septic systems and/or commercial/industrial areas. These are areas with concentrated activities that could result in groundwater contamination in the event of an accident or if the activities are managed poorly.

In the City of Fernley and in the Mound House area, Watch Areas were drawn by the Team to include areas outside of but close to the SWPAs. The Watch Areas include land uses with the potential to contaminate groundwater in the event of an accident or if the areas are not managed properly.

The final SWPAs were reviewed by the Local Planning Team using the on-line Flex Viewer for ease of comparison with other GIS overlays. The SWPAs were named for ease of reference using the water system number and well names.

Table 3-6 below summarizes the steps used by the Local Planning Team in delineating the SWPA boundaries and maps of the final SWPAs are provided in Appendix A.

Table 3-6. SWPA Delineation Steps

Step	Details
Step 1. Map Development and Review	Mapped components include: > Wellhead locations, the 2, 5, and 10-year well capture boundaries for active wells and potential future wells. > Parcel boundaries. > Potential Contaminant Sources as described in Section 3.3. > Land use designations.
Step 2: Draw boundaries using GIS	> Drawn along the parcel boundaries that intersect the modeled 10-year well capture zone. > Where parcels are large (greater than 5 acres), then a 200-foot buffer outside of the 10-year capture zone was used instead of the parcel boundary. > Adjacent wells with close or overlapping capture zones were merged into the same SWPA. > Drawn to include adjacent PCSs as well as certain areas with high concentrations of residential and/or commercial septic systems. > Watch Area boundaries were developed using information on zoning, PCSs and input from the SWPP teams.
Step 3: Verify Boundaries	> The SWPA boundaries were reviewed by the Local Planning Team.
Step 4: Name SWPAs	> The SWPAs were named by the last four digits of the Nevada System Number (i.e. NV0032) and the well name.
Step 5: Map preparation	> The maps are made available through the Flex Viewer site as well as via PDF copies available on the web.

3.2.2 SWPA Extent and Characteristics

The Local Planning Team delineated 31 SWPAs that include all 60 of the current and planned future public wells in Lyon County. The City of Fernley has one Watch Area for an industrial area and three SWPAs. There are five SWPAs in the greater Dayton area with one Watch Area identified in Mound House for an industrial area with commercial septic systems. There are four SWPAs in the Stagecoach area. There are six SWPAs in the greater Stagecoach area. There are seven SWPAs in Mason Valley and four in Smith Valley. The SWPA land uses and management acreage are detailed in Appendix D.

The largest SWPA is a combination of six wells in Mason Valley for the City of Yerington and Weed Heights wells and is 2,683 acres in size. The smallest SWPA is 19 acres for a well that currently serves a bar. Seven of the SWPAs are over 1,000 acres, 16 are over 100 acres and eight are less than 100 acres in size.

Private land or land owned by local governments comprises the majority of all SWPA acreage. Primary uses of private land in the SWPAs is suburban/residential (33%) and commercial/industrial (35%). Other uses include agriculture (5%) and parks and open space (12%). State and Federal land, not privately held, is primarily the Bureau of Land Management (BLM), the Bureau of Reclamation (BOR) or the State of Nevada.

3.3 Potential Contaminant Source Inventory

3.3.1 Summary

A potential contaminant source (PCS) inventory was performed to identify potential hazards to the quality of a community's drinking water supply. PCSs in the SWPAs were identified through an inventory of the existing wellhead protection plans, meetings with water system operators, evaluation of the local hydrogeology, review of existing on-line databases, and review of the ISWPP guidance. The PCS results assisted the Team in designing management tools to prevent future contamination. Appendix D provides detailed information about the methodology used to develop and evaluate the PCS inventory, based on PCS information current during the development of this CSWP Plan.

There are a wide variety of potential contaminant sources within and near the source water protection areas. The primary contaminants of concern for the communities in Lyon County are high nitrates from septic systems and hazardous or poisonous materials from commercial, industrial and manufacturing areas as well as from homes and agriculture. Other PCSs located within the SWPAs include underground storage tanks, automotive shops, and areas irrigated with treated effluent. In Fernley, storm water retention basins are also a concern. In Mound House, commercial septic systems prompted the team to define a watch area.

The observations during field surveys indicated that the SWPAs appeared to be adequately protected. However there were specific PCSs that could adversely affect drinking water quality for these areas in the future. For example, the high density of septic tanks in parts of Fernley, Dayton, Stagecoach, and Mason prompted the Team to include the future conversion from septic to sewage systems, when feasible, as a management approach for related organic, inorganic and microbiological contamination. Many types of industry, businesses, land uses, and activities may impact ground water quality (as indicated by active NDEP Bureau of Corrective Actions case files throughout the plan area), so the Team recommended local business owner education programs, particularly for existing businesses located within SWPAs.

3.3.2 PCS Inventory

The Team conducted an inventory of the PCSs in and near the source water protection areas. The inventory was initiated first through discussions amongst Team members and utility operators to identify primary concerns. Other PCSs were identified and mapped using data from existing regulatory databases and previously endorsed WHP Plans. Finally, the source water protection areas were reviewed by driving reconnaissance to observe the known and possible new PCSs. Following the inventory and field review, areas of concern were discussed with the Team members and documented.

The existing databases that were reviewed for the desktop portion of the inventory include:

- Existing Wellhead Protection Plans
- Source Water Assessment Program Reports from the Nevada Bureau of Safe Drinking Water
- Nevada Division of Environmental Protection interactive map resources available for facilities regulated by the Bureaus of Corrections, Regulation and Reclamation, Water Pollution Control, and Waste Management.
- Nevada Division of Environmental Protection aboveground and underground storage tank database.
- Nevada Department of Motor Vehicles (DMV) Licensed Businesses including: repair shops, registered garages and wreckers.
- US Environmental Protection Agency regulatory databases available through the Geospatial Data Access Project.
- Lyon County Assessor parcel record information locations of individual septic system and private wells.
- Utility databases of sanitary sewer and storm drainages systems.
- Nevada Employer Directory Database provided sorted by North American Industry Classification System (NAICS) Code
- Available mapping of floodplain, land, use, zoning, and aerial photography.

3.3.3 Potential Contaminant Source Evaluation

The Team identified three broad categories of PCSs in Lyon County. Each of these PCS categories require different considerations for control, management and monitoring, therefore it is helpful to consider them in the following groups:

1. Facilities that store and handle hazardous materials, nutrients, or chemicals. Discharge to the environment from these facilities is not anticipated, but could potentially occur in accidental or catastrophic situations. These types of sources throughout Lyon County include industrial facilities, commercial facilities, and residential activities.
2. Facilities or activities that by their nature or by design distribute materials to the environment. These types of sources in the SWPAs include residential and commercial septic systems, wastewater treatment systems, stormwater systems, weed and pest control, open deep pits, and unused or “orphaned” well casings and firefighting chemicals.
3. Facilities or activities that convey polluting materials from one point to another. Discharge to the environment from these facilities occurs over time through leakage, spills or in accidental or catastrophic situations. These types of sources in the SWPAs include pipelines and pump stations, railways, local roads and highways.

Summary tables and the key characteristics of each SWPA, including potential sources, are presented in Appendix D.

3.3.4 Potential Contaminant Sources by Community

Countywide the most prevalent facility related PCSs are industrial facilities, automotive facilities, and facilities with storage tanks; each making up roughly 20 percent of the total number in SWPAs. Agricultural activities, highway corridors, and municipal waste type activities (wastewater, commercial septic systems, recycling/scrap yards, etc.) each made up approximately 10 percent of the total number.

The greatest number of industrial PCSs (manufacturing, machine and metal working, plastics or chemical processing, etc.) are located in the Moundhouse area, with about half as many in the Fernley area, as well as a few area Dayton. The Fernley area encompasses the greatest number of sites where environmental regulations have been required (discharge permits, hazardous materials, registered tanks, etc.), though the Moundhouse area follows it closely in numbers. The most numerous automotive related PCSs (repair shops, carwashes, wrecking yards, etc.) are located in Moundhouse, but significant percentages are also found in Yerington and Fernley SWPAs. The majority of underground storage tanks closures and corrective actions (tank closures or spill/leak cleanups) occur in the Yerington and Fernley areas. The majority of active gas stations occur in the Dayton area. Agriculture related PCSs (irrigated fields, irrigation ditches, fertilizer/pesticides uses) are the most common in Mason Valley area.

In addition to facility related PCSs, residential type PCSs, such as septic systems and/or private residential wells occur countywide. The number of parcels residential PCSs significantly outnumbers the sum total of the business related PCSs, making residential with PCSs the most common type on a countywide basis. Septic systems are closely associated with nitrate contamination in groundwater. Septic systems are most numerous in the Moundhouse SWPA, where residential, commercial and industrial developments currently have no sanitary sewer service. SWPAs Carson Plains and Mason Valley SWPAs have the next largest counts of residential septic systems, followed by the Stagecoach area. Septic tank density can also indicate potential risk of groundwater contamination. Based on 10-year well capture zones, wells having the highest densities (around 1 systems per acre) occur in SWPAs near Mason, Mark Twain and Stagecoach. Wells capture zones with moderate densities (0.2 to 0.5 systems per acre) also occur in SWPAs encompassing Moundhouse, the area due north of Dayton, Smith Valley near Wellington, and the residential area southwest of Fernley.

Each SWPA has unique characteristics that are presented in Appendix D. Within the larger SWPAs, site specific PCSs and land uses may present different risks to the individual wells. Databases in Appendix D can be used to review and update the risks to individual public wells.

3.4 Source Water Protection Management Strategies

Based on the results of the PCS survey, the Team developed management strategies to manage the PCSs in the communities and a schedule for implementation to prevent future contamination. The management strategies will help the communities avoid contaminants from being released in SWPAs, which in turn could avoid costly and/or irreversible damage to the water source.

The following sections summarize the management strategies prioritized by the Local Planning Team for the public water systems in Lyon County. These management strategies are broad and will be implemented using the Action Plan. The Action Plan is described in Section 4.0 and detailed in Appendix E.

3.4.1 Countywide Strategies

Protecting groundwater supplies is important to the entire Lyon County population. The following strategies have been identified as applicable to all persons working or living in Lyon County.

Public Education and Outreach

Public education and outreach is an important tool to help people that work and live in the County to understand how their actions at work and at home have the potential to impact the water quality of the community. Education and outreach will be targeted for each specific audience. For instance, specific information for septic system owners will be distributed regarding proper septic system maintenance. School programs will be provided using the ground water and watershed physical models. Community leaders will be informed of source water protection and environmental stewardship. Emergency management personnel will be trained in the use of the on-line Flex Viewer GIS tool.

Brochures, pamphlets, web pages, and presentations will be designed to present source water issues and protection efforts to the public in an understandable fashion. The public education and outreach will promote voluntary source water protection efforts and build public support for a community's source water protection program.

Household Hazardous Waste

Developing household hazardous waste programs for each community was one of the primary actions desired by the Local planning Team to help protect water quality. Although Fernley already has a program in place, this program could be expanded. At a minimum the more populated communities, Fernley, Dayton, and Yerington, should implement programs. The programs should consider ease of use for the general public, recycling, types of materials and expected quantities. Communities should consider collaboration including pooling resources in development or expansion of existing programs.

The household hazardous waste management programs can reduce the quantity of household hazardous waste being disposed of improperly. The programs can be used in localities where disposal of household wastes in municipal landfills or by illegal dumping potentially threatens groundwater and environmental health.

Development Standards

Lyon County will consider adopting development standards to include SWPA protection. Development codes and regulations may include new requirements or incentives for low impact development and best management standards.

3.4.2 Focused Strategies for Source Water Protection Areas

The following strategies apply specifically to lands located within SWPAs to reduce the potential for source water contamination in SWPAs. Because SWPAs encompass the 2-, 5-, and 10-year capture zones for public supply wells, these areas warrant special protective actions.

Property Owner Awareness

Land and business owners in the SWPAs will be made aware of the significance of the SWPAs and the impact that individual property owners can have on water quality for drinking water. Awareness strategies make land and business owners aware of the SWPA locations and to be

cautious with potential contaminants and their impacts on drinking water. Direct mailers and development standards may be used.

Inter-Agency Coordination

The community utility managers, planners and other appropriate departments will coordinate with the NDEP and emergency responders to ensure protection of source water and minimize duplication of efforts. The focus is to share pertinent information and maximize efficiencies.

Monitoring

Monitoring programs will continue, expand or be developed to document and track the quality of the groundwater supply and predict aquifer properties or the movement of contaminant plumes. The monitoring programs will have specific goals in order to provide the most effective information for the PWSs.

New Infrastructure Projects

New infrastructure projects are an effective means to minimize potential for release of contaminants into the environment, or eliminate conduits for contaminants to reach public drinking water sources. The main infrastructure identified is extending sewer mains to underserved areas. CSWP Plan provides a means for identifying and prioritizing future needs, which is a foundation for funding assistance

Source Water Protection Team

The Source Water Protection Team will establish the structure and resources to maintain the program as a living, useful tool. The team will update the plan and GIS data as needed, coordinate training staff, implement grant procurement, and strive to implement the plan.

3.4.3 Community-Specific Management Strategies

During the process of identifying PCSs and delineating the SWPAs, Each PWS within Lyon County has specific needs that differ from the other communities. By identifying these needs within this document, it allows for assistance with prioritization, coordination with other jurisdictions and a vehicle for developing potential funding sources. In addition to the countywide and general management strategies, the following actions are specific to each SWPA.

City of Fernley

The City of Fernley has several existing public outreach, groundwater monitoring, and household hazardous waste programs that may be expanded to include the SWPA components. There are also several existing wells that may be improved to bring them up to current standards.

Lyon County

Lyon County will expand several existing public outreach and coordination efforts to include the new SWPA components. There are also several wells that may be improved for security. Other wells may be brought online that are currently inactive.

Stagecoach GID

Stagecoach GID will work to provide water to their customers that meet the standards for nitrate and arsenic. This includes striving to obtain funding to tie into the Carson Valley – Eagle Valley – Dayton Valley water line.

Silver Springs MWC

The Silver Spring MWC will strive to obtain funding and support to improve the production of the Deodar well.

The City of Yerington

The City of Yerington will work to abandon and replace two wells and install a new well north of town as needed.

3.5 Contingency Plan

3.5.1 Introduction

Contingency planning within the context of this CSWP Plan provides guidance and direction to the local communities and PWSs in the event the aquifer or main source of drinking water is significantly contaminated. The contingency plan should demonstrate each community's planning capacity to address a long-term emergency situation. The contingency planning considers time frame needed for each community to switch to an alternate source, the quantity and quality of the alternate water sources, and the local resources. The contingency plan also includes conservation measures intended to prolong the use and availability of water supplies (e.g., during periods of interim decision making, remediation, or new source development).

3.5.2 Existing Plans Relating to Contingency Measures

Contingency plans are included in each of the five approved WHP Plans previously developed for the public water systems in Lyon County. These plans all reference several plans that are required by the Nevada Administrative Code (NAC) relating to short term and long term contingencies to protect water quality and quantity. These plans include an emergency plan, cross-connection control plan, operation and maintenance manual and a water conservation plan. Some or all of these plans will be used in conjunction with this Contingency Plan depending on the situation.

Emergency Plan

The Emergency Plan contains short-term solutions to an immediate shutdown, either due to quantity problems, response to contaminant threat, or natural disaster. Public water suppliers in Nevada work with the Nevada Division of Emergency Management (DEM) through County emergency management representatives if an emergency response is required. The DEM assists with short-term problems, such as spill response and coordinating the trucking of water to the afflicted community. The plan contains a list of available resources, emergency notifications, hypothetical scenarios and affected facilities including water sources, distribution systems, pump stations, storage tanks and covered reservoirs.

Cross Connection Control Plan

The Cross Connection Control Plan provides information on how to prevent unauthorized connections to the PWS that could potentially contaminate the system during a loss of pressure. This plan identifies all activities needed to ensure that no unprotected service connections exist between the water system and sources of pollution or contamination.

Operation and Maintenance Manual

Each PWS maintains an O & M Manual that provides information on the purpose, function, operation and interaction of facilities of the system, describers the capabilities and

limitations of the system, and identifies procedures to control system processes. This manual is required under NAC 445A, 6667 and must be maintained at each facility of the water system for use by the operators and other personnel of the facility.

Water Conservation Plan

The Water Conservation Plans outline procedures to be followed in the event of water shortages due to drought, overuse, or contamination. Water conservation plans require an analysis of the effectiveness of proposed water conservation measures, as well as an analysis of the effectiveness of utilizing a conservation-based water rate structure. The Water Conservation Plans also outline proposed water conservation enforcement measures.

3.5.3 Short-Term Contingency

Short-term water supply options provide temporary relief until permanent solutions can be implemented. The Emergency Plans for each PWS describe actions for short term contingencies in detail. A list of potential alternate supply options is included below; however, the emergency water supply options listed here are not intended to provide permanent solutions for the affected community.

Operational Adjustments: In the event that one of the wells becomes contaminated, municipal public water suppliers should be able to meet system demands by making some operational adjustments such as using other wells and using stored water.

Boiled Water: Boiled water may be ordered at the discretion of the well manager or as directed by the Bureau of Safe Drinking Water.

Bottled Water or Potable Water Trucks: Bottled water is available in the immediate area at local stores. Potable water trucks may be brought in from adjacent communities.

Water Conservation and Rationing: In the event that demand cannot be met, conservation and rationing orders may be given.

Backup Generators: In the event of an extended power failure backup generators may be used for wells to meet average day demand.

3.5.4 Long-Term Contingency

In the event of significant contamination of a drinking water source, the water providers with wells in the particular contaminated aquifer region may be subject to long-term deficits in their water supplies. The larger municipal systems typically have multiple wells that provide a level of flexibility in pumping from alternate sources. However, water supply would also have to be supplemented by a new source such as an agreement with an adjacent water system or a replacement well. Replacement well siting is discuss in section 3.6. The following bullets summarize existing alternatives and on-going water sharing coordination efforts

- Douglas County, Carson City, and Lyon County Utilities have been coordinating regarding a water transmission between Douglas County, Carson City and the Dayton area. Multiple wells and transmission options provide alternative sources in the event of local aquifer contamination.
- Protecting water quality in the Carson River, the source of recharge for groundwater for Dayton, Stagecoach, and Silver Springs (the Carson Plains and Churchill Valley sub basins), is the focus of coordinate d efforts in multiple agencies and organizations.

- Stagecoach GID has explored replacement well locations, but naturally occurring water quality issues make connection to a regional water system through Lyon County Utilities the most viable alternative water source.
- The Cities of Fernley and Yerington both have systems that can alternate between pumping multiple wells. They also continue to explore alternate well sitings for improved water quality and system redundancy.
- The City of Fernley regularly communicates with Washoe County regarding the quality of the Truckee River, a significant source of aquifer recharge in the Fernley Area. The City of Fernley has also reached out to the Pyramid Lake Paiute Tribe to coordinate water resources.
- The City of Yerington and Weed Heights have the ability to intertie their water systems if necessary.

3.6 New Well Siting and New Water Sources

During the economic boom between 2000 and 2009 the population of Lyon County increased by 52 percent and was one of the top 10 fastest growing counties in the U.S. for three years. This boom was followed by a drop in population (-3.6% 2009 to 2010) and numerous home foreclosures. During the boom, water providers significantly expanded their water supply infrastructure and planning for future water supplies. This existing information was useful in preparation of this section of the plan.

Future wells, their locations, and probable pumping rates were identified by the water purveyors that can provide alternative sources for long-term contingencies. These wells were included in the CSWP Plan and are depicted on all of the appropriate maps. The management strategies to protect these future locations have been incorporated into the CSWP Plan. The wells are listed and described in Table 3-7 below.

Table 3-7. Future Wells/Sources

Water System Name and Primary Contact	Future Well with Description
NV0000032 Dayton Valley Water System (Lyon County Utilities) Lyon County Public Works Operation Manager	> Well 1 (Future): This new well location will replace the inactive Well 1. The location was selected based on anticipated aquifer water quality, quantity and land ownership by the LCU. > Rolling A Well (Future): This is an existing well previously used for agriculture. The well needs to be improved to meet the LCU standards for municipal uses. > ASR Well (Future): This is an existing well previously constructed for Aquifer Storage and Recovery (ASR). The well needs to be improved to meet the LCU goals for capacity.
NV0000062 City of Fernley Public Works City Engineer	> Well 8 (Future): This is an existing non-potable well used to fill water trucks. The well needs to be reconstructed prior to any connection to the City's water treatment system. > Well 12 (Future): This is an existing exploratory well and is not connected to the City's water system. > Armstrong Well (Future): This is an existing irrigation well and is not connected to the City's water system.
NV0000224 Stagecoach General Improvement District Manager	> Tie in to an expanded water transmission main from Dayton. Source water development is needed.
NV0000255 City of Yerington City Manager	> Mason Road (Future): The existing Mason Road well would be re-drilled or otherwise improved to increase production and improve water quality. > Rio Vista (Future): The existing Rio Vista well would be re- drilled or otherwise improved to increase production and improve water quality. > Well 1 (Future): This would be a new well location at the northern end of the City. The location was selected based on anticipated aquifer water quality, quantity, and land ownership.

Source water development is needed in Stagecoach because existing groundwater resources are high in arsenic and nitrate levels. All other communities currently have sufficient source water resources.

4.0 PLAN IMPLEMENTATION

4.1 Action Plan Goals

The CSWP Plan will be implemented through the Action Plan. The Action Plan was developed by the Team to achieve the five goals of this CSWP Plan, addresses the identified PCSs, and is built from the Team's management strategies identified in Section 3.4 of this document.

The Action Plan implementation is dependent upon resource availability and the actions will be implemented as funding and time allows. All of the communities in Lyon County need technical or funding assistance in completing the action plan projects. While some actions have a higher priority than others, implementation will depend, to a large extent, on the resource and teaming opportunities that are available. The communities will take advantage of grants and other funding sources for implementation.

4.2 Action Plan Projects

The Action Plan projects are organized in Appendix E from broad countywide projects, to projects within SWPA boundaries only, and finally to specific projects for individual communities. The projects are not listed in order of priority but rather grouped by strategy type (i.e. education, coordination, monitoring, etc.). These action plan projects were identified and compiled from the existing WHP plans and as outcomes of Team meetings. The specific actions also have supporting agencies, the priority, and projected completion timeframe. The Action Plan follows the management strategies to achieve the CSWP Plan goals.

The Action Plan addresses the primary contaminants of concern for the communities in Lyon County, which are high nitrates from septic systems and hazardous or poisonous materials from commercial, industrial and manufacturing areas as well as from homes and agriculture primarily through outreach and education. The Action Plan also addresses underground storage tanks, automotive shops, and areas irrigated with treated effluent.

The countywide Action Plan includes developing presentations for public meetings, materials for web pages, updates to the Flex Viewer, and outreach to well and septic owners. One of the highest priority countywide actions is development of Household Hazardous Waste Programs.

Actions specific to land within the SWPAs include public outreach, changes to business or development permitting, planning coordination, and specific monitoring. Each PWS also has specific needs to implement the CSWP Plan such as addressing storm water retention basins in Fernley, installing new wells, and developing specific code referencing SWPAs. The Action Plan is detailed in Appendix E.

4.3 Potential Funding Opportunities

There are a variety of potential funding sources that may be considered to implement the action plan. A key component for most funding sources is to build relationships and leverage resources. The Local Planning Team benefits from each other's knowledge and contacts. Table 4-1 lists some of the potential funding sources available.

Table 4-1. Potential Funding Considerations

Funding Agency	Program Name
Bureau of Reclamation	> Water and Energy Efficiency, > Rural Water Supply > Water for America and > System Optimization Review
EPA	> Advancing Public Health Protection through Water Infrastructure Sustainability > Clean Water State Revolving Fund > Drinking Water State Revolving Fund
USDA	> Water and Waste Disposal and > Water, Sewer, and Solid Waste Disposal Management > Rural Development Solid Waste Planning > Community Facilities Loan and Grant Program
FEMA	> Flood Mitigation Assistance
State of Nevada	> AB 198 Grants > CWA 319 NPS Grants > Solid Waste Program > ISWPP Implementation Grants

4.4 Updates

The CSWP Plan is a dynamic living document. The Team will meet at least once per year to revisit the plan, assess the plan update needs, follow-up on implementation, coordination and progress. This meeting will be coordinated by Lyon County with the PWSs.

5.0 PUBLIC PARTICIPATION

Public education is an important tool as identified in the Management Strategies and the Action Plan to promote voluntary protection actions and to build public support for plan implementation. In this case, taking action refers to changing practices and behaviors that could be detrimental to source waters. The objective of the CSWP Public Education Plan is to present water providers, residents and other stakeholders with a set of tools and tactics that can be used to promote source water protection outreach and education.

The Action Plan, provided in Appendix E, identifies several specific audiences for targeted education and outreach to promote proper care and maintenance when potential contaminants are involved. These target audiences for this Education Plan are residents, businesses classified as PCSs, well owners, and septic system owners because their actions may impact water quality. School students in or near the 6th grade level are also a specified audience because they are receptive, the messages blend well with their existing curriculums and because children often provide pressure on their parents and relatives to "do the right thing". Finally, community leaders are targeted because they make decisions regarding development and regulations that may impact water quality.

Proposed methods for educating the target audiences range from watershed and groundwater model presentations at public meetings and community events to flyers and posters. The appropriate educational tools depend on the extent of the community's communication resources and the audience. Although the audiences range from community leaders, to business managers, to schoolchildren, the primary messages are the same. The following are the highlights of the public education plan provided in Appendix F.

Primary Messages:

What is source water protection?
Source water protection is a way to prevent drinking water from becoming polluted. Much can be done to prevent pollution, such as the informed use of land and disposal of chemicals.

Why is it important to protect water at the source?
Protecting public drinking water supplies at the source before pollution enters our drinking water supply lessens potential health issues, the high costs associated with water treatment, and source water development. Public water users can help protect our community's source water. Managing land uses and human-caused sources of contamination are the keys to preventing pollution before it enters our drinking water supply at the source.

What contaminates the water we drink?
There are numerous types of pollutants that can contaminate surface and ground water. Some contaminants are a result of improper disposal of common household products such as cleaning products, waste oil, pet waste, fertilizers and pesticides. Others may be used or generated by businesses such as dry cleaners, film processing centers, salons, cemeteries, petroleum storage and handling, etc. These and other harmful products, when improperly disposed of may threaten to contaminate our drinking water.

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